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ABSTRACT

Conditions and elements that affect women's participation in the sciences and career advancement opportunities are examined in this report. A review of the status of women scientists as well as descriptions of strategies for increasing participation in the sciences are presented. In the status reports, gender-stereotyped career expectations and the differential treatment of women in the work force were identified as major impediments to participation in science and technology related fields. The differential treatment of women was believed to be the most serious violation of the principle of equality of opportunity. Two major intervention programs have been designed and are being monitored by the National Science Foundation (NSF). These are: (1) the "Research Opportunities for Women Scientists and Engineers" (ROW) program which awards grants to women who have not previously been principal investigators on NSF grants, or who are reentering the research community after a period of absence; and (2) the "Visiting Professorships for Women" (VPW) program which enables the scientist to conduct advanced research at a host institution and also undertake lecturing, counseling and other activities to increase visibility and to provide encouragement for other women. Eligibility requirements and status reviews for each of the programs are discussed. (ML)

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NEW DIRECTIONS FOR INTERVENTION: REPORT FROM THE NATIONAL SCIENCE FOUNDATION COMMITTEE ON EQUAL OPPORTUNITIES IN SCIENCE AND TECHNOLOGY

By

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Introduction

The preceding papers in this session focus on the goal of increasing the number of female students who receive science and engineering education at the pre-college, college and graduate level. My presentation concerns the goal of achieving equal opportunity for career advancement within the work force for women with advanced technical degrees.

These two goals are closely interlocked. We cannot expect to encourage more women to undertake advanced training in science and engineering if, in comparision to equally qualified men, they must accept lower salaries, slower rates of promotion, and barriers to tenure appointments and senior administrative positions in the nation's academic establishment.

First I will review what we know about the position of women in the technical work force. Then I will describe some strategies of intervention designed to help women participate more fully in the scientific and engineering community of the nation.

Invited address for the symposium, "Increasing the Participation of Women in Science Education: Successful Models, Current Knowledge, and Future Directions for Research," Annual Meeting of the American Educational Research Association, San Francisco, California, April 19, 1986. The opinions expressed in this paper are those of the author and do not necessarily reflect the position of the Committee on Equal Opportunities in Science and Technology, the National Science Foundation, or the California Public Utilities Commission.

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Status of Women in the Science and Engineering Work Force

The Congressional Office of Technology Assessment issued in December 1985 a Technical Memorandum titled Demographic Trends and the Scientific and Engineering Work Force, a useful review of the present status of women scientists. This study cited two main factors as major impediments to women's participation in science and engineering. The first factor is one that has been mentioned by previous speakers. It is "gender-stereotyped career expectations among younger women entering the science and engineering talent pool."[1] The previous speakers have discussed ways to change these expectations in order to encourage more female students to pursue science at the pre-college and college level.

The OTA study found that:

> The second principal factor discouraging women from pursuing scientific and engineering careers is their differential treatment in the work force... Women's attrition rates from scientific and engineering careers are 50 percent higher than men's and their unemployment rates are more than double. Women's salaries are significantly lower than men's in almost all fields of science, in every employment sector and at comparable levels of experience. In academia men are far more likely than women to hold tenure-track positions, to be promoted to tenure and to achieve full professorships, even when academic age, field, and quality of graduate school attended are controlled for.
>
> The differential treatment of women in the work force is thought by some to be the most serious violation of the principle of equality of opportunity because it affects people who have established, by virtue of obtaining an advanced degree, the right to pursue a scientific or engineering career based solely on the quality of their work. It also has a significant discouraging efect on female students in the educational pipeline, who see the future benefits of their investment in science and engineering education eroded by potential unemployment and underutilization in the work force.[2]

THE OTA STUDY LARGELY RELIED ON EXISTING LITERATURE ABOUT THE STATUS OF WOMEN IN SCIENCE. WHILE THIS LITERATURE IS EXTENSIVE, MORE DATA ARE NEEDED PARTICULARLY ON THE SITUATION OF MINORITY WOMEN AND ON THE CAREER PROGRESS OF YOUNGER WOMEN. NEVERTHELESS, THE OTA CITATIONS FROM NATIONAL STUDIES CLEARLY INDICATE THAT WOMEN ARE NOT YET ACHIEVING THEIR FULL POTENTIAL IN THE SCIENTIFIC WORK FORCE OF THE UNITED STATES.

THE OTA STUDY NOTED THAT WOMEN HOLD ASSISTANT PROFESSORSHIPS AND NON-FACULTY POSITIONS MORE THAN TWICE AS OFTEN AS MEN.[3] USING DATA COMPILED BY THE NATIONAL SCIENCE FOUNDATION, OTA FOUND THAT "IN 1982 THE MEDIAN ANNUAL SALARY OF WOMEN SCIENTISTS AND ENGINEERS WAS 75 PERCENT OF THAT OF THEIR MALE COUNTERPARTS: $26,000 VS. $35,000... EMPLOYED FEMALE SCIENTISTS AND ENGINEERS WITH LESS THAN 5 YEARS EXPERIENCE EARNED ON THE AVERAGE 90 PERCENT AS MUCH AS THEIR MALE COUNTERPARTS; THOSE WITH 31 TO 35 YEARS EXPERIENCE EARNED LESS THAN 78 PERCENT."[4] OTA ALSO QUOTED A REPORT BY BETTY VETTER THAT FOUND "AMONG ALL ACADEMICALLY EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS IN 1983, 65.6 PERCENT OF THE MEN, BUT ONLY 39.1 PERCENT OF THE WOMEN, WERE TENURED."[5]

IN 1981, THE NATIONAL RESEARCH COUNCIL CONDUCTED A SURVEY ON CAREER OUTCOMES IN A MATCHED SAMPLE OF MEN AND WOMEN PH.D.S. IT STUDIED A SAMPLE OF MEN AND WOMEN "WITH DEGREES IN THE SAME FIELD, IN THE SAME YEAR, FROM EQUALLY PRESTIGIOUS UNIVERSITIES." THE NRC FOUND THAT "FOR A GIVEN PAIR OF ONE WOMAN AND ONE MAN WITH MATCHED CHARACTERISTICS (10-19 YEARS PAST THE PH.D.), THE MAN IS 50 PERCENT MORE LIKELY THAN THE WOMAN TO HAVE BEEN PROMOTED TO FULL PROFESSOR."[6]

ONE CAN ARGUE THAT THESE COMPARISONS ARE NOT CONTROLLED FOR QUALITY AND QUANTITY OF THE INDIVIDUAL SCIENTISTS' WORK. CRITICS HAVE QUESTIONED WHETHER MALE AND FEMALE SCIENTISTS ARE EQUALLY PRODUCTIVE IN TERMS OF SIGNIFICANT RESEARCH PUBLICATIONS. THE OTA STUDY USES CAREFUL QUALIFIERS: "THE

DISCRIMINATORY PRACTICES ARE PERCEIVED BY MANY TO BE THE MOST SERIOUS IMPEDIMENTS..."[7] AND "THE DIFFERENTIAL TREATMENT OF WOMEN IN THE WORK FORCE IS THOUGHT BY SOME TO BE THE MOST SERIOUS VIOLATION OF THE PRINCIPLE OF EQUALITY..."[8] (EMPHASIS ADDED).

OTHER AUTHORS HAVE NOT BEEN SO CAUTIOUS. VIVIAN GORNICK, QUOTED IN THE OTA REPORT, HAS WRITTEN THAT CAREER DISCRIMINATION FOR A WOMAN SCIENTIST "MEANS SUSTAINING A FAINT BUT CONTINUOUS HUMILIATION THAT, LIKE A LOW GRADE INFECTION, IS CUMULATIVE IN ITS POWER AND DISINTEGRATING IN ITS ULTIMATE EFFECT."[9]

THE PLACE OF WOMEN IN THE SOCIAL STRATIFICATION OF SCIENCE AND ENGINEERING IN THE UNITED STATES HAS FOR SOME TIME BEEN KNOWN TO BE AN INFERIOR ONE IN TERMS OF THE MEASURES OF PAYSCALE, TENURE RATE, AND ACCESS TO SENIOR POSITIONS IN PRESTIGE INSTITUTIONS. MANY ANALYSTS HAVE TRIED TO DETERMINE THE EXTENT TO WHICH THE CHARACTERISTIC OF BEING FEMALE INFLUENCES THE WAY WOMEN ARE JUDGED FOR CAREER ADVANCEMENT IN THE SCIENTIFIC WORK FORCE.

I WILL DISCUSS AS AN EXAMPLE THE 1973 COLUMBIA STUDY BY JONATHAN R. COLE AND STEPHEN COLE IN THEIR BOOK SOCIAL STRATIFICATION IN SCIENCE. THIS BOOK WAS GENERALLY CONCERNED WITH SOCIAL PATTERNS OF BEHAVIOR IN SCIENCE, AND INCLUDES A CHAPTER ON DISCRIMINATION AGAINST WOMEN IN SCIENCE. THE AUTHORS DEFINE THE TERM DISCRIMINATION AS FOLLOWS: "USING FUNCTIONALLY IRRELEVANT STATUSES IN EVALUATING AN INDIVIDUAL'S PERFORMANCE AS A SCIENTIST."[10]

COLE AND COLE DECLINED TO ACCEPT THE VIEW THAT THE PROPORTION OF WOMEN AND MINORITIES IN SCIENCE OUGHT TO APPROACH THE PROPORTION OF THESE GROUPS IN THE POPULATION AT LARGE. THEY ARGUED, "OBVIOUSLY, NOT EVERY PERSON IN THE POPULATION IS QUALIFIED TO BE A SCIENTIST. THEREFORE, COMPARING THE PROPORTIONS OF PARTICULAR GROUP IN THE POPULATION AND IN SCIENCE TELLS US LITTLE ABOUT THE EXTENT OF DISCRIMINATION."[11] THEY NEGLECTED TO EXPLAIN EXACTLY WHY WE SHOULD EXPECT DRAMATIC DIFFERENCES IN THE PROPORTIONS OF THE

MALE AND FEMALE POPULATIONS QUALIFIED TO BE SCIENTISTS, OR WHY, AS OF 1973, ONLY 8 OF THE 866 MEMBERS OF THE NATIONAL ACADEMY OF SCIENCES WERE WOMEN.[12]

COLE AND COLE FOUND THAT THERE WAS "WIDESPREAD BELIEF AMONG SCIENTISTS AND NONSCIENTISTS THAT WOMEN ARE DISCRIMINATED AGAINST IN APPOINTMENT TO HIGH-PRESTIGE SCIENCE DEPARTMENTS; THAT THEY ARE LESS LIKELY THAN MEN TO RECEIVE PROMOTIONS TO TENURED POSITIONS; THEY MUST WAIT LONGER FOR THEIR ASCENDANCY AND THAT THEIR SALARIES ARE LOWER AT EVERY ACADEMIC LEVEL."[13]

WAS THIS DISCRIMINATION REALITY OR AN INCORRECT PERCEPTION? TO ANSWER THIS QUESTION, COLE AND COLE DECIDED TO CONSIDER ONLY WHAT THEY CALLED "'SURVIVORS' AMONG WOMEN SCIENTISTS--THOSE WHO HAVE OVERCOME THE CULTURAL FORCES IMPEDING THEIR CHOICE OF SCIENCE AS A CAREER AND HAVE ACTUALLY RECEIVED THEIR DOCTORATES."[14] THEY ANALYZED A SAMPLE OF 499 MEN AND WOMEN SCIENTISTS IN CHEMISTRY, BIOLOGY AND PSYCHOLOGY. THEY USED FOUR MATCHING CRITERIA: YEAR OF DOCTORATE (1957-1958), UNIVERSITY WHERE THE PH.D. WAS EARNED, FIELD, AND SPECIALITY. THEY FOUND THAT "MEN AND WOMEN SCIENTISTS WITH SIMILAR TRAINING TEND TO WIND UP IN ACADEMIC DEPARTMENTS OF EQUAL PRESTIGE."[15] THEY DID NOT HAVE ADEQUATE SALARY DATA SO THEY COULD NOT COMPARE SALARY DIFFERENTIALS. IN THEIR SMALL SAMPLE THEY DID FIND THAT "THE MEASURED INTELLIGENCE (I.Q. TESTS) OF WOMEN DOCTORATES IS ON THE AVERAGE SLIGHTLY, IF NOT SIGNIFICANTLY, HIGHER THAN THAT OF THE MALE DOCTORATES."[16]

THE BIG DIFFERENCE THEY FOUND WAS THAT IN TERMS OF PUBLICATIONS, "MALE SCIENTISTS IN THE MATCHED SAMPLE, ON THE AVERAGE, ARE MORE PRODUCTIVE THAN WOMEN."[17] THEY FIRST THOUGHT THIS MIGHT HAVE SOMETHING TO DO WITH WOMEN HAVING MORE FAMILY OBLIGATIONS. BUT THEY FOUND IN THEIR SAMPLE THAT "UNMARRIED WOMAN SCIENTISTS PUBLISH FAR LESS THAN MEN SCIENTISTS IN ALL FAMILY CATEGORIES... FAMILY OBLIGATIONS ONLY INFLUENCE THE PRODUCTIVITY RATES OF WOMEN HAVING THREE OR MORE CHILDREN. WOMEN WITH SMALLER FAMILIES ARE NO LESS LIKELY

TO PUBLISH THAN UNMARRIED WOMEN."[18] WHEN COLE AND COLE CONTROLLED FOR THEIR FINDING THAT WOMEN SCIENTISTS PRODUCE FEWER AND LESS FREQUENTLY CITED PAPERS THAN MEN, THEY CONCLUDED THAT "MEN AND WOMEN IN AMERICAN SCIENCE WITH SIMILAR BACKGROUNDS ARE TREATED SIMILARLY BY THE REWARD SYSTEM OF SCIENCE... WOMEN ARE NOT SIGNIFIANTLY UNDERREWARDED IN HONORIFIC RECOGNITION OR THEIR ACADEMIC AFFILIATION, ONCE WE TAKE INTO ACCOUNT THEIR ACHIEVEMENTS AS SCIENTIFIC RESEARCHERS[19]...WOMEN SCIENTISTS, REGARDLESS OF THEIR MARITAL STATUS OR THE SIZE OF THEIR FAMILIES, SIMPLY PRODUCE FEWER SCIENTIFIC PAPERS, AND PAPERS OF LESS IMPACT, THAN MEN IN COMPARABLE POSITIONS."[20] HOWEVER, COLE AND COLE DID ADMIT THAT "SEX STATUS DOES HAVE A SIGNIFICANT INDEPENDENT EFFECT ON THE OVERALL ACADEMIC RANK OF SCIENTISTS. WOMEN ARE NOT AS FREQUENTLY PROMOTED TO SENIOR POSITIONS ESPECIALLY AT THE BETTER UNIVERSITIES, AS ARE THE MEN WHO COME FROM THE SAME DOCTORAL DEPARTMENTS."[21]

COLE AND COLE SUGGESTED A CONTROVERSIAL EXPLANATION FOR THEIR OBSERVATION. THEY PROPOSED THAT "DUE TO SOCIALIZATION AND THE VALUE SYSTEM IN THE LARGER SOCIETY, IT IS POSSIBLE THAT IN THE PAST, WOMEN HAVE NOT BEEN AS COMMITTED TO THEIR CAREERS AND NOT AS DRIVEN TO ACHIEVE THE HEIGHTS OF SUCCESS...[22] ...WOMEN MAY BE LESS MOTIVATED AND THEREFORE LESS PRODUCTIVE THAN MEN."[23] COULD THIS BE THE MANIFESTATION OF WHAT VIVIAN GORNICK CALLED THAT "LOW-GRADE INFECTION"?

BY 1979, HOWEVER, JONATHAN COLE HAD FOUND IN A NEW STUDY THAT WOMEN SCIENTISTS WITH PH.D.S. WERE SIGNIFICANTLY LOWER IN CAREER RANK THAN MEN FROM THE SAME PH.D. CLASS TWELVE YEARS AFTER THE PH.D. WHILE HE FOUND "NO EVIDENCE ...THAT PROLIFIC WOMEN ARE SYSTEMATICALLY EXCLUDED FROM OR PUSHED OUT OF GOOD SCIENCE DEPARTMENTS," HE DID CONCLUDE THAT THESE PRODUCTIVE WOMEN "ARE NOT NEARLY AS LIKELY TO HOLD HIGH-RANKING POSITIONS...AS ARE THEIR EQUALLY PROLIFIC

MALE COLLEAGUES."[24] BETTY VETTER AGREES WITH COLE'S FINDING, AND ADDS, "SO MUCH FOR THE THEORY THAT LOW PUBLISHING RATES ARE RESPONSIBLE FOR WOMENS' FAILURE TO ADVANCE AS FAST AS THEIR MALE COHORTS."[25]

AFTER A REVIEW OF 10 STUDIES ON COMPARATIVE PUBLICATION RATES, RACHEL ROSENFELD IN 1984 CONCLUDED THAT "THE DIFFERENCES IN PUBLICATIONS BY SEX IS RELATIVELY SMALL, CERTAINLY SMALLER THAN DIFFERENCES IN CAREER PATTERNS BY SEX."[26] ONE MEASURE OF SCIENTIFIC RECOGNITION IS THE NUMBER OF CITATIONS A SCIENTIST'S WORK RECEIVES IN THE TECHNICAL LITERATURE. IN A 1979 STUDY, RESKIN AND HARKINS FOUND THAT "CITATIONS TO THE WORK OF MEN SIGNIFICANTLY INCREASED THEIR CHANCES OF HAVING A TENURED POSITION TEN YEARS AFTER THEY RECEIVED THEIR PH.D.S. IT HAD NO EFFECT FOR WOMEN."[27]

THE 1985 OTA STUDY IS SILENT ON THE ISSUE OF WHETHER POOR PRODUCTIVITY IN RESEARCH CAUSES THE SLOW CAREER ADVANCEMENT OF WOMEN IN SCIENCE. IT CONTAINS NO REFERENCE TO THE 1973 EXPLANATION BY COLE AND COLE THAT CAREER DIFFERENTIALS ARISE BECAUSE WOMEN ARE "LESS MOTIVATED" THAN MEN. PERHAPS THAT VIEW HAS BECOME OBSOLETE, AS HAVE OTHER ATTITUDES OF THE 1970S, SUCH AS THIS ONE FROM GAYLE YATES' 1975 BOOK, <u>WHAT WOMEN WANT:</u> "MEN ARE ENCOURAGED MORE THAN WOMEN TO MAINTAIN THEIR PHYSICAL BODIES THROUGH DIET AND EXERCISE."[28]

BUT THERE IS AN ANALYSIS IN GAYLE YATES' BOOK THAT I WOULD LIKE TO RETRIEVE FOR SETTING A 1986 CONTEXT IN WHICH TO VIEW THE STRATEGIES FOR INTERVENTION TO DEAL WITH THE DIFFERENTIAL POSITION OF WOMEN IN SCIENCE IN THE UNITED STATESTODAY. YATES PRESENTED AN ANALYSIS OF THE WOMEN'S MOVEMENT IN THE 1970S, AND RECOGNIZED WITHIN IT THREE MAIN IDEOLOGIES. SHE TERMED THESE (1) THE FEMINIST IDEOLOGY; (2) THE WOMEN'S LIBERATIONIST IDEOLOGY; AND (3) THE ANDROGYNOUS IDEOLOGY.[29]

In the feminist ideology, Yates sees the standard norms as being established first by men, then adopted by women. The ordering principle is then to make women equal to men, to bring them up from a historically secondary position to equality of opportunity. Those who subscribe to the second ideology, that of women's liberation, believe that women should separate themselves from men and should arrive at their own standards from their own identity as a sisterhood. The third ideology Yates calls the andogynous paradigm, in which norms and cultural modifications are arrived at by men and women acting and changing together. In the words of Alice Rossi, the goal of this last ideology is "that tenderness and expressiveness should be cultivated in boys and socially approved in men...and achievement need, workmanship and constructive aggression should be cultivated in girls and approved in women so that a female of any age would be similarly free to express these qualities in her social relationship."[30] Incidentally, for those of you with androgynous leanings, you will be glad to know that this month's United Airlines magazine reports that "its's not macho men who make the best lovers," or "markedly feminine women," but "androgynous people of both sexes whose personalities include a mix of characteristics traditionally associated with one sex or the other."[31]

Directions for intervention to improve the participation of women in science can be viewed in terms of these models. For example, I can be seen to be a product of an early version of the women's liberationist model of separation from men. I attended Bryn Mawr, a women's college which since the 1880's has been producing female geologists in isolation from men. There were no male students in my undergraduate classes. I studied with a never-married woman geology professor, and I copied her to the extent that by the time I was a senior I had already decided to do my doctoral thesis in her esoteric

SPECIALITY, METAMORPHIC PETROLOGY. THERE IS NO QUESTION THAT WOMEN'S COLLEGES HAVE CONTRIBUTED A DISPROPORTIONATE SHARE OF BACCALAUREATE SOURCES OF WOMEN FOR GRADUATE PROGRAMS AND NATIONAL LEADERSHIP IN SCIENCE. THEY CONTINUE TO PROVIDE A VITAL ALTERNATIVE ENVIRONMENT FOR UNDERGRADUATE AND GRADUATE EDUCATION.

TO THE ANDROGYNOUS MODEL BELONG MANY OF THE NEW STRATEGIES DESIGNED TO ENSURE THAT FEMALE STUDENTS IN ELEMENTARY AND HIGH SCHOOL ARE ENCOURAGED TO ENJOY AND PERFORM WELL IN SCIENCE AND MATHEMATICS. WE ARE TRYING TO ELIMINATE GENDER-STEREOTYPED CAREER EXPECTATIONS, AND WE SEEK TO CHANGE THE SEX ROLE SOCIALIZATION PROCESS BY ELIMINATING SEX-STEROTYPING BY PARENTS AND TEACHERS. THESE STRATEGIES ADDRESS THE PROBLEMS THAT MATINA HORNER IDENTIFIED IN HER CLINICAL PSYCHOLOGICAL STUDY WHICH SHOWED THAT A WOMAN IS OFTEN "IN A DOUBLE BIND REGARDING ACHIEVEMENT...SHE WORRIES NOT ONLY ABOUT FAILURE BUT ALSO ABOUT SUCCESS...IF SHE SUCCEEDS SHE IS NOT LIVING UP TO SOCIETAL EXPECTATIONS ABOUT THE FEMALE ROLE... MOST MEN DO NOT FIND MANY INHIBITING FORCES IN THEIR PATH IF THEY ARE ABLE AND MOTIVATED TO SUCCEED. A WOMAN LEARNS THE TRUTH OF SAMUEL JOHNSON'S COMMENT: 'A MAN IS IN GENERAL BETTER PLEASED WHEN HE HAS A GOOD DINNER UPON HIS TABLE THAN WHEN HIS WIFE TALKS GREEK.'"[32] AS MANY OF YOU KNOW, BRYN MAWR'S TRADITIONAL REPLY TO MR. JOHNSON WAS THAT "ONLY OUR FAILURES MARRY."

THE STRATEGIES FOR WOMEN ALREADY IN THE WORK FORCE FALL MORE READILY INTO THE FEMINIST PARADIGM. ACCORDING TO THIS MODEL, "RIGHTS AND OPPORTUNITIES OPEN TO MEN SHOULD BE OPEN TO WOMEN. WOMEN SHOULD RECEIVE EQUAL PAY FOR EQUAL WORK. WOMEN SHOULD HAVE EQUAL WORK. UNIVERSITIES SHOULD NOT DISCRIMINATE AGAINST WOMEN."[33] THE INTERVENTION STRATEGIES I WILL BE DISCUSSING ARE DESIGNED TO ENABLE WOMEN TO PARTICIPATE EQUALLY AS MEN DO WITHIN THE SOCIAL STRATIFICATION OF SCIENCE.

What is the measure of status in science? Contribution to scientific knowledge is the most highly valued form of scientific activity. A second indicator of prestige is the authority to determine the criteria for awarding grants and to select scientists for advancement. Although scientists certainly seek higher salaries, the main career goal for scientists is not salary, but prestigious recognition by peers. This recognition is expressed in terms of (1) honors and national prizes; (2) appointment to prestigious jobs, to professorships in top departments and laboratories; and (3) professional visibility through which a scientist's work is widely known by colleagues and frequently cited in the scientific literature.[34]

The elite in science are those who have earned peer recognition for their contributions to science and those who hold key administrative positions. They have the power to grant and deny tenure, to approve faculty promotions, to set research funding priorities, and to determine who receives grants, fellowships and prizes. A 1983 survey by the National Academy of Sciences showed that men move up this ladder of success more readily than women. Among scientists and engineers holding doctoral degrees and appointments in universities, men are more likely to be awarded tenure, and they are promoted more quickly. The survey showed that among scientists 46 years of age and older, 27 percent of women are still untenured compared to 8 percent of men. For young scientists below 35 years of age, 13.4 percent of men have already been granted tenure compared to 7.6 percent of women.[35]

Strategies for Intervention

Given this structure for career advancement in science, I will now discuss some of the strategies for intervention that are being monitored by the National Science Foundation Committee on Equal Opportunities in Science and Technology. I am a member of the Committee, and also serve on its Subcommittee

ON WOMEN. THE COMMITTEE ALSO OPERATES SUBCOMMITTEES WHICH FOCUS ON EDUCATIONAL AND CAREER OPPORTUNITIES IN SCIENCE FOR MINORITIES AND THE PHYSICALLY DISABLED. CONGRESS ESTABLISHED THE COMMITTEE BY ENACTING PUBLIC LAW 96-516, THE NATIONAL SCIENCE FOUNDATION FY 1981 AUTHORIZATION ACT AND THE SCIENCE AND TECHNOLOGY EQUAL OPPORTUNITIES ACT.

IN ITS FIRST REPORT TO CONGRESS IN 1982, THE COMMITTEE CONCLUDED THAT WOMEN ARE NOT ADVANCING IN SCIENTIFIC AND TECHNICAL CAREERS AT RATES COMMENSURATE WITH THEIR NUMBERS IN THE POPULATION. IN RESPONSE TO THIS SITUATION, THE COMMITTEE WORKS TO PROMOTE CONDITIONS THAT ENCOURAGE WOMEN TO UNDERTAKE SCIENTIFIC RESEARCH, TO PARTICIPATE IN THE RESEARCH REVIEW PROCESS, AND IN GENERAL TO BE FULL CONTRIBUTING MEMBERS OF THEIR PROFESSIONS. THE COMMITTEE ALSO SEEKS TO EXPAND EFFORTS THAT ALLOW WOMEN WITH SCIENTIFIC TRAINING TO RE-ENTER SCIENTIFIC AND TECHNICAL FIELDS AFTER CAREER INTERRUPTIONS.

THE COMMITTEE HAS TOLD CONGRESS THAT "CONTINUING DISCRIMINATION AGAINST WOMEN SCIENTISTS AND ENGINEERS IN ACADEMIC, INDUSTRIAL AND GOVERNMENT POSITIONS HAS BEEN DOCUMENTED EXTENSIVELY... INEQUITABLE HIRING PRACTICES, MARKEDLY LOWER PROMOTION RATES, AND LARGE SALARY DEFICITS CONFRONT THESE WOMEN EVEN WHEN THEY ARE SHOWN TO BE AT LEAST EQUAL TO THEIR MALE COLLEAGUES IN ALL OBJECTIVE MEASURES OF ABILITY, EXPERIENCE, AND PERFORMANCE."[36]

THE COMMITTEE MONITORS TWO MAJOR INTERVENTION PROGRAMS IN THE NATIONAL SCIENCE FOUNDATION WHICH ARE DESIGNED TO IMPROVE THE PARTICIPATION OF WOMEN IN THE SCIENTIFIC WORK FORCE.

THE FIRST IS CALLED "RESEARCH OPPORTUNITIES FOR WOMEN SCIENTISTS AND ENGINEERS." CONGRESS AUTHORIZED THE CONCEPT OF THIS PROGRAM IN PUBLIC LAW 96-516. THIS PROGRAM, CALLED "ROW" FOR SHORT, AWARDS RESEARCH GRANTS TO WOMEN WHO HAVE NOT PREVIOUSLY BEEN PRINCIPAL INVESTIGATORS ON NSF GRANTS, OR WHO ARE RE-ENTERING THE RESEARCH COMMUNITY AFTER A PERIOD OF ABSENCE.[37] THE OBJECTIVE

OF THE PROGRAM IS TO PROVIDE OPPORTUNITIES FOR WOMEN SCIENTISTS AND ENGINEERS TO BECOME ACTIVELY ENGAGED IN RESEARCH AS INDEPENDENT INVESTIGATORS. IT IS DESIGNED TO OVERCOME INSTITUTIONAL BARRIERS THAT DISPROPORTIONATELY INHIBIT PROPOSAL SUBMISSIONS FROM WOMEN SCIENTISTS AND ENGINEERS. PROPOSALS ARE ACCEPTED IN ALL FIELDS OF SCIENCE AND ENGINEERING. THE REGULAR NSF DISCIPLINARY PROGRAMS CONDUCT THE QUALITY REVIEW FOR THE ROW PROPOSALS.

TO BE ELIGIBLE FOR THE PROGRAM, A WOMAN MUST MEET EITHER ONE OF THE FOLLOWING CRITERIA. SHE MUST HAVE RECEIVED HER DOCTORATE AT LEAST 3 YEARS PRIOR TO SUBMISSION OF THE PROPOSAL, AND MUST NOT HAVE PREVIOUSLY SERVED AS A PRINCIPAL INVESTIGATOR ON AN INDIVIDUAL FEDERAL GRANT. ALTERNATIVELY, SHE MUST HAVE A DOCTORATE, HAVE HAD HER RESEARCH CAREER INTERRUPTED FOR AT LEAST 2 OF THE PAST 5 YEARS, AND HAVE NOT SERVED AS A PRINCIPAL INVESTIGATOR SINCE REENTERING HER CAREER. THOSE WOMEN WHO HAVE BEEN ALREADY WORKING AS PRINCIPAL INVESTIGATORS ARE ASSUMED TO BE OBTAINING THEIR RESEARCH SUPPORT THROUGH PARTICIPATION IN THE STANDARD NSF DISCIPLINARY PROGRAMS.

APPLICANTS IN ALL CATEGORIES OF EMPLOYMENT ARE ENCOURAGED TO APPLY, INCLUDING THOSE IN RESEARCH ASSOCIATE AND OTHER NON-TENURED POSITIONS. THIS PROVISION IS INCLUDED BECAUSE A GREATER PROPORTION OF WOMEN THAN MEN ARE IN NON-TENURED POSITIONS IN ACADEMIC INSTITUTIONS. WOMEN IN SUCH OFF-LADDER POSITIONS OFTEN ARE NOT AUTHORIZED TO APPLY FOR EXTERNAL RESEARCH FUNDING AND THUS HAVE LITTLE CHANCE "TO ESTABLISH INDEPENDENT RESEARCH RECORDS AND IMPROVE THEIR PROSPECTS."[38] IF UNIVERSITY RULES REQUIRE IT, A REGULAR FACULTY MEMBER CAN SERVE AS THE PERSON RESPONSIBLE FOR ADMINISTERING GRANT FUNDS AT THE DEPARTMENTAL LEVEL; HOWEVER, THE ROW APPLICANT IS REGARDED AS THE PRINCIPAL INVESTIGATOR AND IS EXPECTED TO FUNCTION FULLY IN THAT CAPACITY. THIS PROGRAM SEEKS TO ADDRESS SOME OF THE PROBLEMS THAT HAVE BEEN EVIDENT IN THE NATIONAL

SURVEYS OF WOMEN SCIENTISTS, NAMELY THAT THEY OFTEN ARE IN NON-TENURED POSITIONS, OR THEY MAY HAVE INTERRUPTED THEIR CAREERS AND BE TRYING TO RE-ENTER THE RESEARCH FIELD.

THE RESEARCH OPPORTUNITIES FOR WOMEN PROGRAM HAS GENERATED A LARGE RESPONSE FROM THE SCIENTIFIC COMMUNITY. IN ITS FIRST YEAR, FY 1985, A TOTAL OF 396 PROPOSALS FOR ROW FUNDING WERE RECEIVED. THIS REPRESENTED 11 PERCENT OF ALL THE PROPOSALS THE NSF RECEIVED FROM WOMEN. NEARLY 60 PERCENT OF THE APPLICANTS HAD NEVER BEFORE SUBMITTED AN NSF PROPOSAL. THIRTEEN PERCENT OF THE ROW PROPOSALS WERE IN THE CAREER RE-ENTRY CATEGORY.

THE NSF HAD PLANNED INITIAL FUNDING FOR THE ROW PROGRAM AT A LEVEL OF $500,000. IN JANUARY, 1985, OUR SUBCOMMITTEE ON WOMEN PASSED A RESOLUTION STATING THAT THIS PROPOSED FUNDING LEVEL WAS SO SMALL THAT IT WOULD PERMIT A SUCCESS RATIO OF ONLY 1-1/2 TO 3 PERCENT. WE SAID THIS WAS UNACCEPTABLE AND ASKED THAT FUNDS BE MADE AVAILABLE TO MAKE THE ROW SUCCESS RATE COMMENSURATE WITH THE QUALITY OF THE PROPOSALS RECEIVED AND THE OVERALL SUCCESS RATE FOR NEW NSF PROPOSALS.

IN FY 1985, NSF MADE 38 ROW AWARDS FOR A TOTAL OF $2.37 MILLION; THE ADDITIONAL $1.8 MILLION IN FUNDING WAS TAKEN FROM THE MAINSTREAM PROGRAM DIRECTORATES. THIS AUGMENTED FUNDING LEVEL PERMITTED A SUCCESS RATE OF 11 PERCENT. THIS COMPARES TO AN OVERALL SUCCESS RATE OF 46 PERCENT FOR ALL PROPOSALS TO NSF, AND A 36 PERCENT RATE FOR ALL WOMEN SUBMITTING PROPOSALS INCLUDING THE REGULAR NSF PROGRAMS AND ROW. ASSISTANT PROFESSORS AND NON-FACULTY ACADEMICS RECEIVED 68 PERCENT OF THE ROW AWARDS.

IS THE ROW PROGRAM NEEDED? WOMAN PRINCIPAL INVESTIGATORS (PIS) RECEIVED 7.5 PERCENT OF THE AWARDS AND ONLY 5.1 PERCENT OF NSF TOTAL FUNDING IN FY 84. IN THE FIRST YEAR OF ROW FUNDING, FY 1985, WOMEN PIS ACCOUNTED FOR 8.2 PERCENT OF ALL NSF AWARDS AND 5.9 PERCENT OF TOTAL DOLLARS OF NSF RESEARCH FUNDING.

ONE WAY WE CAN PUT THOSE FIGURES IN PERSPECTIVE IS TO NOTE THAT IN 1983, WOMEN REPRESENTED 14.4 PERCENT OF THE SCIENTISTS AND ENGINEERS HOLDING DOCTORAL DEGREES IN THE NATION.

THE LOWER PERCENTAGES OF AWARDS TO WOMEN COMPARED TO THEIR PERCENTAGES IN THE POTENTIAL INVESTIGATOR POOL ARE APPARENT WITHIN MOST OF THE NSF DISCIPLINARY PROGRAMS. ONE COMPONENT OF THE LOWER FUNDING LEVEL FOR WOMEN ACCORDING TO NSF IS THE CONCENTRATION OF WOMEN IN THE BIOLOGICAL AND BEHAVIORIAL SCIENCES, IN WHICH AVERAGE AWARD SIZES ARE SMALLER THAN IN THE PHYSICAL SCIENCES. HOWEVER, SINCE WOMEN RESEARCHERS ARE CLEARLY NOT ACHIEVING RESEARCH AWARD LEVELS COMMENSURATE WITH THEIR NUMBERS IN THE NATIONAL WORK FORCE, I BELIEVE AN EXPANDED ROW EFFORT IS NEEDED AT NSF.

A SECOND INTERVENTION PROGRAM FOR WOMEN IS THE NSF "VISITING PROFESSORSHIPS FOR WOMEN."[39] THIS "VPW" PROGRAM IS DESIGNED TO ENCOURAGE WOMEN TO PURSUE TECHNICAL CAREERS BY PROVIDING GREATER VISIBILITY FOR WOMEN SCIENTISTS AND ENGINEERS EMPLOYED IN INDUSTRY, GOVERNMENT, AND ACADEMIC INSTITUTIONS. ITS CONCEPT WAS AUTHORIZED BY CONGRESS IN PUBLIC LAW 96-516.

THE PROGRAM ENABLES AN EXPERIENCED WOMAN SCIENTIST OR ENGINEER TO CONDUCT ADVANCED RESEARCH AT A HOST INSTITUTION WHERE IN ADDITION TO RESEARCH, SHE WILL UNDERTAKE LECTURING, COUNSELING, AND OTHER ACTIVITIES TO INCREASE THE VISIBILITY OF WOMEN SCIENTISTS IN THAT INSTITUTION, AND PROVIDE ENCOURAGEMENT FOR OTHER WOMEN TO PURSUE CAREERS IN SCIENCE AND ENGINEERING. THE ACTIVITIES CAN BE EITHER AT THE UNDERGRADUATE OR GRADUATE LEVEL, AND THE AWARDS ARE GENERALLY FOR 12 MONTHS. TO BE ELIGIBLE, A WOMAN MUST HAVE A DOCTORATE AND MUST HAVE CONDUCTED INDEPENDENT RESEARCH IN AN ACADEMIC INSTITUTION, INDUSTRY OR THE PUBLIC SECTOR. IN ADDITION, SHE MUST BE CURRENTLY OR RECENTLY AFFILIATED WITH AN INSTITUTION OF HIGHER EDUCATION, A RESEARCH INSTITUTE, GOVERNMENT OR INDUSTRY.

THIS PROGRAM INTRODUCES WOMEN AS ROLE MODELS INTO ACADEMIC INSTITUTIONS WHERE THERE ARE FEW WOMEN ON THE FACULTY; IT PROVIDES WOMEN WITH MORE OPPORTUNITIES TO CARRY OUT INDEPENDENT RESEARCH, AND GENERALLY INCREASES STUDENT AND FACULTY AWARENESS OF THE CONTRIBUTION OF WOMEN IN SCIENCE AND ENGINEERING.

LAST YEAR THE NSF RECEIVED 138 PROPOSALS IN THE VPW PROGRAM. OF THAT TOTAL, THERE WERE 25 AWARDS. FOUR AWARDEES ARE FULL PROFESSORS, 10 ARE ASSOCIATE PROFESSORS AND 5 ARE ASSISTANT PROFESSORS, ONE IS A NON-FACULTY ACADEMIC, TWO ARE FROM INDUSTRY AND THREE WORK FROM NATIONAL SCIENTIFIC LABORATORIES. THE MEDIAN YEAR OF RECEIPT OF THE PH.D. AMONG AWARDEES WAS 1976. FIFTEEN OF THE 25 AWARDEES HAD NEVER BEFORE RECEIVED AN NSF GRANT. THIS PROGRAM NOT ONLY IS BRINGING MORE WOMEN INTO POSITIONS OF ACADEMIC VISIBILITY, LIKE ROW IT IS ALSO EXPANDING THE POOL OF WOMEN PIS WHO HAVE SUCCESSFULLY EARNED FEDERAL FUNDING FOR THEIR RESEARCH.

IN ADDITION TO PROVIDING OVERSIGHT OF THE ROW AND VPW PROGRAMS, THE SUBCOMMITTEE ON WOMEN ALSO MONITORS ACTIVITIES ELSEWHERE IN THE NATIONAL SCIENCE FOUNDATION. ONE GOAL OF OUR SUBCOMMITTEE HAS BEEN TO INCREASE THE PARTICIPATION OF WOMEN ON SCIENCE ADVISORY COMMITTEES OPERATED BY NSF. THERE ARE CURRENTLY ABOUT 65 SUCH COMMITTEES COVERING ALL FIELDS OF SCIENCE AND ENGINEERING. AS OF NOVEMBER 30, 1985, 92 PERCENT OF THE MEMBERS WERE WHITE AND 82 PERCENT WERE MALE.

SOME WOULD SAY THAT THE COMPOSITION OF THE NSF ADVISORY COMMITTEES IS NOT OUT OF LINE. WOMEN CONSTITUTE 18 PERCENT OF NSF COMMITTEE MEMBERS, AND 14.4 PERCENT OF THE NATION'S SCIENCE AND ENGINEERING DOCTORATES ARE HELD BY WOMEN. THE SUBCOMMITTEE ON WOMEN, HOWEVER, DISAGREES THAT GOALS AT THE NSF SHOULD BE SET AT PARITY WITH THE PRESENT COMPOSITION OF THE SCIENTIFIC POPULATION. WE ARE ACTIVELY SEEKING TO CHANGE THE COMPOSITION OF THE SCIENTIFIC POPULATION BY

ENCOURAGING MORE WOMEN AND MINORITIES TO EARN DOCTORATES IN SCIENCE AND ENGINEERING. WE BELIEVE THAT STUDENT PERCEPTION OF THE TREATMENT WOMEN SCIENTISTS RECEIVE IN THE WORK FORCE IS AN IMPORTANT FACTOR IN DETERMINING CAREER CHOICES. WE DO NOT WANT TO PERPETUATE THE UNDER-REPRESENTATION OF WOMEN AND MINORITIES IN SCIENCE. OUR COMMITTEE HAS ADOPTED ITS POLICY THAT "PARITY WITH THE GENERAL POPULATION IS THE IDEAL, LONG-RANGE GOAL FOR THE SCIENTIFIC AND PROFESSIONAL WORKFORCE AT NSF."[40]

OUR SUBCOMMITTEE ON WOMEN HAS RECOGNIZED THAT THERE IS AN UNSATISFACTORILY LOW PARTICIPATION BY WOMEN SCIENTISTS ON FEDERALLY FUNDED INTERNATIONAL PROGRAMS, AND HAS URGED THAT MORE WOMEN BE INCLUDED AS MEMBERS OF INTERNATIONAL SCIENTIFIC TEAMS.[41] OUR COMMITTEE HAS ALSO BEEN VERY CONCERNED THAT INTERNAL STAFFING PATTERNS FOR WOMEN SCIENTISTS WITHIN THE NSF HAVE SHOWN LITTLE IMPROVEMENT OVER TIME. ALTHOUGH MOST OF THE NSF SENIOR LEVEL POSITIONS (DIRECTOR, DEPUTY DIRECTOR, AND ASSISTANT DIRECTORS) HAVE BECOME VACANT AT ONE TIME OR ANOTHER SINCE 1984, NO WOMEN HAVE BEEN NAMED TO THEM.

THERE ARE ADDITIONAL STRATEGIES TO IMPROVE THE CAREER STATUS OF WOMEN IN SCIENCE. PARTICIPATION OF WOMEN SCIENTISTS ON NATIONAL POLICY ADVISORY PANELS SUCH AS THE COMMITTEES OF THE NATIONAL RESEARCH COUNCIL HELPS INCREASE THE VISIBILITY OF WOMEN IN THE SCIENCE COMMUNITY. WHEN THESE COMMITTEES SPONSOR TECHNICAL STUDIES, WOMEN COMMITTEE MEMBERS CAN IN TURN INVOLVE OTHER WOMEN SCIENTISTS BY PROPOSING THEM AS CANDIDATES TO CONDUCT THE STUDIES. WOMEN SCIENTISTS ALSO CAN GAIN ACCESS TO DECISION MAKING BY SERVING ON NATIONAL SELECTION COMMITTEES FOR PROFESSIONAL PRIZES, AND ON VISITING COMMITTEES ADVISING UNIVERSITY DEPARTMENTS. AS MILDRED DRESSELHAUS HAS EMPHASIZED, THE ADDITIONAL RESPONSIBILITY OF THESE "EXTRA-CURRICULAR" ACTIVITIES IS AN

ADDED CAREER BURDEN WHICH WOMEN SCIENTISTS MUST BEAR UNTIL SUCH TIME AS WOMEN HAVE MORE FULLY ACHIEVED EQUITABLE REPRESENTATION IN THE SCIENTIFIC COMMUNITY.[42]

SOME STRATEGIES ARE ACTIONS THAT INDIVIDUAL WOMEN CAN UNDERTAKE. ONE IS TO BECOME A MENTOR FOR OTHER WOMEN IN THE EARLY STAGES OF THEIR CAREERS BY ADVISING THEM ON LONG RANGE PLANS AND PROVIDING HELP THROUGH JOB RECOMMENDATIONS. ANOTHER IS TO PARTICIPATE IN AN "OLD GIRLS' NETWORK." DURING THE ADMINISTRATION OF GOVERNOR JERRY BROWN IN CALIFORNIA, WOMEN CABINET SECRETARIES AND DEPARTMENT DIRECTORS ASSEMBLED RESUMES OF QUALIFIED WOMEN FOR CARLOTTA MELLON, WHO WAS THE GOVERNOR'S APPOINTMENTS SECRETARY. THIS POOL OF CANDIDATES PROVIDED A LARGE NUMBER OF WOMEN WHO WERE APPOINTED BY GOVERNOR BROWN TO GOVERNMENT BOARDS, COMMISSIONS AND DEPARTMENTS.

OUR SUBCOMMITTEE ON WOMEN HAS RECOMMENDED A SIMILAR STRATEGY TO THE NSF. WE HAVE PROPOSED THAT A VITA BANK BE ESTABLISHED OF PAST WOMEN AND MINORITY PIS TO SERVE AS A POOL OF POTENTIAL CANDIDATES FOR ADVISORY COMMITTEES AND PROGRAM MANAGER APPOINTMENTS AT NSF.

CONCLUSION

MOST OF THIS AFTERNOON'S SESSION HAS FOCUSED ON HOW TO GET MORE WOMEN EDUCATED IN SCIENCE. WE HAVE SEEN THAT THERE IS A NEED TO ENCOURAGE FEMALE STUDENTS TO PURSUE SCIENCE AND MATHEMATICS IN THEIR PRE-COLLEGE AND COLLEGE YEARS. BUT THERE HAS BEEN A PERSISTENT ATTITUDE IN THIS COUNTRY, "AS MUCH IN INSTITUTIONS OF HIGHER LEARNING AS IN THE WORLD AT LARGE, THAT WOMEN MAKE GOOD STUDENTS BUT UNPRODUCTIVE SCHOLARS."[43] AS MORE WOMEN ARE BEING EDUCATED IN SCIENCE, WE NEED PROVE THIS ATTITUDE TO BE MISTAKEN, AND HELP WOMEN TO ATTAIN THEIR FULL POTENTIAL AS PRODUCTIVE SCHOLARS IN THE NATIONAL WORK FORCE. WE MUST ASSURE THAT THE NATION ENJOYS THE ADVANTAGE OF THEIR TALENTS AND CONTRIBUTIONS TO THE ECONOMY.

ADVANCES IN BASIC AND APPLIED SCIENCES ARE ESSENTIAL TO KEEP THE UNITED STATES ECONOMICALLY COMPETITIVE WITH OUR FOREIGN RIVALS, WHO DO NOT SKIMP ON GOVERNMENT SUPPORT FOR SCIENCE. WE CANNOT AFFORD TO WASTE OUR NATIONAL EDUCATIONAL INVESTMENT IN TRAINED WOMEN SCIENTISTS AND ENGINEERS. BUT WE WILL SQUANDER IT IF WE CONTINUE TO INHIBIT THEIR CAREER ADVANCEMENT THROUGH DISCRIMINATORY PRACTICES IN OUR UNIVERSITIES AND LABORATORIES.

THE GRAMM-RUDMAN-HOLLINGS LEGISLATION HAS CREATED "VAST UNCERTAINTY ABOUT FEDERAL FUNDING LEVELS FOR RESEARCH."[44] THE SUBCOMMITTEE ON WOMEN HAS EXPRESSED ITS CONCERN ABOUT POTENTIAL EFFECTS OF REDUCTION-IN-FORCE (RIF) PERSONNEL CUTS ON THE EMPLOYMENT OF WOMEN AND MINORITY SCIENTISTS AND ENGINEERS IN GOVERNMENT AGENCIES. MANY WOMEN SCIENTISTS LACK SENIORITY AND VETERANS PREFERENCE, WHICH TENDS TO MAKE THEM PARTICULARLY VULNERABLE DURING A RIF PERIOD.[45]

WE KNOW THAT WOMEN SCIENTISTS ARE NOT ACHIEVING THEIR FULL POTENTIAL IN THE NATIONAL WORK FORCE AND THE FEDERAL BUDGET CRISIS IS LIKELY TO MAKE THE SITUATION WORSE. WE ARE HEADING INTO A VERY TOUGH PERIOD OF FEDERAL SCIENCE BUDGET CUTS AND FIERCE COMPETITION FOR RESEARCH FUNDS. RESEARCH PRODUCTIVITY IS THE KEY TO CAREER ADVANCEMENT FOR SCIENTISTS, SO WE NEED TO TARGET PROGRAMS TO BRING MORE WOMEN SCIENTISTS INTO THE COMMUNITY OF SCHOLARS BEING GRANTED FEDERAL RESEARCH FUNDING SUPPORT.

THE NSF HAS IMPLEMENTED THE INITIAL GRAMM-RUDMAN CUT OF 4.3 PERCENT ($34 MILLION) FOR FY 1986. IN DOING SO, IT PROTECTED FROM ANY CUTS THE "EFFORTS TO INCREASE PARTICIPATION IN SCIENCE BY WOMEN AND MINORITIES."[46] THE NEXT ROUND OF GRAMM-RUDMAN REDUCTIONS COULD BE FAR MORE SUBSTANTIAL. WE MUST BE SURE THAT RESEARCH FUNDING FOR WOMEN ISN'T THE FIRST TO GO WHEN FURTHER GRAMM-RUDMAN BUDGET CUTS HIT.

THE NSF SUBCOMMITTEE ON WOMEN HAS CONCLUDED THAT BARRIERS TO CAREER ADVANCEMENT CONSTITUTE THE MOST SERIOUS PROBLEM FACING WOMEN SCIENTISTS. "PROGRESS HAS BEEN MADE IN ATTRACTING WOMEN TO CAREERS IN SCIENCE AND TECHNOLOGY, BUT THERE HAS BEEN NO COMPARABLE PROGRESS IN OVERCOMING THE BARRIERS TO EQUAL OPPORTUNITY IN THEIR CAREER ADVANCEMENT."[47]

THE GOAL OF EQUAL OPPORTUNITY IN SCIENCE AND TECHNOLOGY IS IMPERATIVE FOR OUR COUNTRY. IF WE ARE TO MAINTAIN ECONOMIC HEALTH AND TECHNOLOGICAL LEADERSHIP IN AN INCREASINGLY COMPETITIVE WORLD ENVIRONMENT, WE MUST NURTURE AND MAKE EFFICIENT USE OF THE TALENT OF ALL OUR SCIENTISTS AND ENGINEERS. WE MUST BE SURE THAT OUR TECHNICAL TALENT POOL INCLUDES THE HUMAN RESOURCES WHO HAVE BEEN TRADITIONALLY UNDERUTILIZED IN OUR SOCIETY, NAMELY WOMEN, MINORITIES AND THE PHYSICALLY DISABLED.

FOOTNOTES

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